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(54) Title: BACTERICIDAL LIQUID DETERGENT COMPOSITION

(57) Abstract: A bactericidal liquid detergent composition comprising; a) from 1% to 50%, by weight of the total composition, of one or more surfactants selected from any of the following surfactant types: anionic, non-ionic, cationic and amphoteric; b) 0.01% to 5%, by weight of the total composition, of at least one nonionic, non-phenolic antimicrobial agent selected from the following groups; benzoic acid, sorbic acid, trimethyl dodecatrienol (commonly hnown as 'farnesol'), dehydroacetic acid and salts thereof; c) from 0% to 10%, by weight of the total composition, of at least one aromatic sulphonate hydrotrope selected from the group consisting of: benzene sulphonate, cumene sulphonate, xylene sulphonate and toluene sulphonate; d) from 0% to 20%, by weight of the total composition, of a water soluble hydroxyl containing solvent, selected from monohydric alcohols, polyhydric alcohols and glycol ethers of the general formula $R-(O-R_1)_n$ - OH (wherein R and R_1 are alkyl groups, which may be the same or different, containing 1 to 4 carbon atoms and n is an integer from 1 to 3); and e) water. The sum total of components 'c' and 'd' is present in the range from 0.5% to 30% by weight of the total composition.

BACTERICIDAL LIQUID DETERGENT COMPOSITION

The present invention relates to a bactericidal liquid detergent composition, particularly, but not exclusively for use as a liquid for handwashing dishes; a personal cleansing liquid such as a hand-washing liquid, shampoo, a bath additive or a shower product; a liquid composition for cleaning fabric, upholstery and/or carpet; or a liquid washing composition for use as an all-purpose cleaner or as a hard surface cleaner for use in kitchens, bathrooms and the like.

The most preferred use of the composition of the invention is as a liquid for use when handwashing dishes. Such hand-dishwashing liquids comprising antimicrobial agents are known in the art.

The present invention seeks to provide an antibacterial liquid detergent composition having enhanced bactericidal activity.

According to the present invention there is provided a bactericidal liquid detergent composition comprising:-

(a) from 1% to 50%, by weight of the total composition, of one or more surfactants selected from any of the following surfactant types: anionic, nonionic, cationic and amphoteric;

(b) from 0.01% to 5%, by weight of the total composition, of at least one non-ionic, non-phenolic antimicrobial agent selected from the following groups: benzoic acid and/or a salt thereof, sorbic acid and/or a salt thereof, trimethyl dodecatrienol (commonly known as 'Farnesol') and dehydroacetic acid and/or a salt thereof;

(c) from 0% to 10%, by weight of the total composition, of at least one aromatic sulphonate hydrotrope selected from the group consisting of: benzene sulphonate, cumene sulphonate, xylene sulphonate and toluene sulphonate;

(d) from 0% to 20%, by weight of the total composition, of a water soluble hydroxyl-containing solvent, selected from monohydric alcohols, polyhydric alcohols and glycol ethers of the general formula $R-(O-R_1)_n-OH$ (wherein R and R_1 are alkyl groups, which may be the same or different, containing 1 to 4 carbon atoms and n is an integer from 1 to 3); and

(e) water;

and wherein the sum total of said components "c" and "d" is present in the range from 0.5% to 30% by weight of the total composition.

The counter ions of the aromatic sulphonate preferably comprise any of the following either alone or in combination:- sodium, potassium, magnesium, calcium, ammonium or mono-, di- or triethanolammonium.

It has been found that a combination of the specific antimicrobial agents and aromatic sulphonate listed above gives rise to an unexpected synergistic increase in bactericidal activity as determined by the European Suspension Test PrEN1040. The tested activity when only one of these materials is present is substantially reduced. From this it can be inferred that the claimed aromatic sulphonate acts as potentiating agents for the selected antimicrobial agents as discussed herein. Consequently substantially reduced

levels of biocidal substances are required to deliver the equivalent antimicrobial efficiency of much higher levels in equivalent compositions not comprising the specified aromatic sulphonates of the invention. This in turn confers environmental and toxicological benefits.

The pH of the formulations of the invention is ideally in the range from 2.0 to 11.0. That said, at least where the selected carboxylic acid materials are used exclusively, it is preferred that the pH is in the range from 2.0 to 7.0 and more preferably in the range from 3.0 to 6.0 as only the free acid (hence nonionic) form of such biocides is "active" within the scope of the current invention. At lower pH values the relative properties of the "free acid" form tends to be higher in the equilibrium mix.

The preferred surfactants of the composition include any of the following either alone or in combination:- anionic, nonionic and amphoteric surfactants. Examples of preferred surfactants for the compositions of the invention are set out below.

Preferred anionic surfactants include any of the following either alone or in combination with other surfactants:- alkyl sulphates, alkyl ethoxy sulphates, alkyl benzene sulphonates, olefin sulphonates, secondary alkane sulphonates, sarcosinates, alkyl sulphosuccinates, alkylamido MEA sulphosuccinates, methyl ester sulphonates and alkyl isethionates.

Preferred non-ionic surfactants include any of the following either alone or in combination with other surfactants:- ethoxylated fatty alcohols, alkyl polyglucosides, alkyl glucamides, alkanolamides (eg alkyl monethanolamides and alkyl diethanolamides).

Preferred amphoteric surfactants include any of the following either alone or in

combination with other surfactants:- alkyl amine oxides, alkyl amidopropylamine oxides, alkyl betaines (including alkyl amidopropyl betaines), alkyl amphoacetates, alkyl amphodiacetates, alkyl propionates and dipropionates, alkyl hydroxysultaines and alkyl amidopropyl hydroxysultaines.

The composition preferably comprises from 5% to 50% by weight of the total composition of surfactant.

The preferred antimicrobial agent is benzoic acid and/or sorbic acid.

The composition preferably comprises from 0.05% to 2% by weight of the total composition of antimicrobial agent.

The composition preferably comprises from 0.5% to 5% by weight of the total composition of aromatic sulphonate hydrotrope.

The water soluble hydroxyl-containing solvent preferably comprises any of the following either alone or in combination:- methanol, ethanol, propanol, butanol, benzyl alcohol, ethylene glycol, monopropylene glycol, dipropylene glycol, glycerine, hexylene glycol, polyethylene glycols, ethylene glycol, monobutyl ether, propylene glycol monomethyl ether, dipropylene glycol, monomethyl ether, propylene glycol n-butyl ether. Particularly preferred hydroxyl-containing solvents include any of the following either alone or in combination:- ethanol, propanol, isopropanol, benzyl alcohol, monopropylene glycol, dipropylene glycol or hexylene glycol.

The composition preferably comprises from 1 to 10% by weight of the total composition of said water soluble hydroxyl-containing solvent.

The composition may additionally comprise additional minor ingredients which do

not have an antimicrobial effect. Such ingredients are known in the art and might include additional hydrotropes such as urea, perfume, colourant or sequesterant.

The bactericidal composition of the invention may be diluted prior to final use at the option of the end user. The composition may be used for cleaning purposes and/or for preventing bacterial contamination of cleaning implements such as cloths and sponges.

The bactericidal composition of the invention may be impregnated into a "wipe", i.e. a disposable towel made from a nonwoven fabric material. This may be used either for cleaning surfaces or as a personal cleansing aid.

In order that the present invention may be more readily understood specific examples thereof are shown below.

EXAMPLES

The following examples include formulae of the invention with % inclusion of ingredients (% weight/weight).

EXAMPLE NO	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Sodium Linear Alkylbenzene (C11-C13) Sulphonate (LAS)	5	5	5	5	5	5	5
Sodium Lauryl Ether Sulphate (2EO)	2	2	2	2	2	2	2
FAE - Clariant (Genapol)	2	2	2	2	2	2	2
CAPB - Goldschmidt (Tegobetain)	1	1	1	1	1	1	1
Benzoic acid (% as free acid)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Ethanol	5	0	0	0	3	0	0
Monopropylene Glycol	0	5	0	0	0	3	0
Sodium Cumene Sulphonate	0	0	2	0	2	2	2
Dipropylene Glycol Monomethyl Ether	0	0	0	2	0	0	2
Water	to 100	to 100	to 100	to 100	to 100	to 100	to 100

Note: all % figures refer to % active, not % as supplied.

All formulations adjusted to pH 5.0 via neutralisation balance of LAS / NaOH.

EXAMPLE NO	8	9	10
Sodium Linear Alkylbenzene (C11-C13) Sulphonate	5	5	5
Sodium Lauryl Ether Sulphate (2EO)	2	2	2
FAE - Clariant (Genapol)	2	2	2
CAPB - Goldschmidt (Tegobetain)	1	1	1
Sorbic acid	0.1	0	0
Dehydroacetic acid	0	0.1	0
Farnesol	0	0	0.1
Monopropylene Glycol	3	3	3
Sodium Cumene Sulphonate	2	2	2
Water	to 100	to 100	to 100

Note: all % figures refer to % active, not % as supplied.

All formulations adjusted to pH 5.0 via neutralisation balance of LAS / NaOH.

It is to be understood that the above described examples are by way of illustration only. Many modifications and variations are possible.

CLAIMS

1. A bactericidal liquid detergent composition comprising;

a) from 1% to 50%, by weight of the total composition, of one or more surfactants selected from any of the following surfactant types: anionic, non-ionic, cationic and amphoteric;

b) from 0.01% to 5%, by weight of the total composition, of at least one nonionic, non-phenolic antimicrobial agent selected from the following groups; benzoic acid, sorbic acid, trimethyl dodecatrienol (commonly known as 'farnesol'), dehydroacetic acid and salts thereof;

c) from 0% to 10%, by weight of the total composition, of at least one aromatic sulphonate hydrotrope selected from the group consisting of: benzene sulphonate, cumene sulphonate, xylene sulphonate and toluene sulphonate;

d) from 0% to 20%, by weight of the total composition, of a water soluble hydroxyl containing solvent, selected from monohydric alcohols, polyhydric alcohols and glycol ethers of the general formula $R-(O-R_1)_n-OH$ (wherein R and R_1 are alkyl groups, which may be the same or different, containing 1 to 4 carbon atoms and n is an integer from 1 to 3); and

e) water;

and wherein the sum total of components 'c' and 'd' is present in the range from 0.5% to 30% by weight of the total composition.

2. A bactericidal liquid detergent composition according to claim 1, wherein the pH of said composition is in the range from 2.0 to 11.0.

3. A bactericidal liquid detergent composition according to claim 1 or claim 2,

wherein the pH of said composition is in the range from 2.0 to 7.

4. A bactericidal liquid detergent composition according to any preceding claim, wherein the pH of said composition is in the range from 3.0 to 6.0.

5. A bactericidal liquid detergent composition according to any preceding claim, wherein the composition comprises one or more anionic surfactants selected from any of the following either alone or in combination:- alkyl sulphates, alkyl ethoxy sulphates, alkyl benzene sulphonates, olefin sulphonates, secondary alkane sulphonates, sarcosinates, alkyl sulphosuccinates, alkylamido MEA sulphosuccinates, methyl ester sulphonates and alkyl isethionates.

6. A bactericidal liquid detergent composition according to any preceding claim, wherein the composition comprises one or more nonionic surfactants selected from any of the following either alone or in combination:- ethoxylated fatty alcohols, alkyl polyglucosides, alkyl glucamides and alkanolamides.

7. A bactericidal liquid detergent composition according to any preceding claim, wherein the composition comprises one or more amphoteric surfactants selected from any of the following either alone or in combination:- alkyl betaines, alkyl amphoacetates, alkyl amphodiacetates, alkyl propionates and dipropionates, alkyl hydroxysultaines, alkyl amidopropyl hydroxysultaines and amine oxides.

8. A bactericidal liquid detergent composition according to any preceding claim, wherein the surfactant constitutes from 5% to 50% by weight, of the total composition.

9. A bactericidal liquid detergent composition according to any preceding claim, wherein the antimicrobial agent is selected from benzoic acid and/or sorbic acid.

10. A bactericidal liquid detergent composition according to any preceding claim, wherein the antimicrobial agent constitutes from 0.05% to 2%, by weight, of the total composition.

11. A bactericidal liquid detergent composition according to any preceding claim, wherein the said at least one aromatic sulphonate hydrotrope constitutes from 0.5% to 5%, by weight, of the total composition.

12. A bactericidal liquid detergent composition according to any preceding claim, wherein the said water soluble hydroxyl containing solvent is selected from any of the following either alone or in combination:- methanol, ethanol, propanol, isopropanol, butanol, benzyl alcohol, ethylene glycol, monopropylene glycol, dipropylene glycol, glycerine, hexylene glycol, polyethylene glycol, ethylene glycol, monobutyl ether, propylene glycol monomethyl ether, dipropylene glycol, monomethyl ether, propylene glycol n-butyl ether.

13. A bactericidal liquid detergent composition according to any preceding claim, wherein the said water soluble hydroxy containing solvent constitutes from 1% to 10%, by weight, of the total composition.

14. A bactericidal liquid detergent composition according to any preceding claim, wherein the said composition is impregnated into nonwoven fabric material to form a wipe.

15. A bactericidal liquid detergent composition as hereinbefore described with reference to any of examples 1 to 10.